

## 4.7(6.1) - Solving Quadratic Equations

Recall:

To solve an equation, find value(s) that satisfy the equation (i.e., make it true).

This value is called the solution or root of the equation.

Ex.1 Solve  $x^2 - 12x + 32 = 0$ 

$$\begin{aligned} & \text{M} \quad \text{A} \quad \text{N} \\ & \frac{32}{-12} \quad \frac{-8}{-4} \quad -4 \\ & = (x-8)(x-4) \\ & \begin{array}{l} x-8=0 \text{ or } x-4=0 \\ \boxed{x=8} \quad \boxed{x=4} \end{array} \\ & = x^2 - 8x - 4x + 32 \\ & = x(x-8) - 4(x-8) \\ & = (x-8)(x-4) \end{aligned}$$

We have most often solved for the zeroes of the quadratic equation, but we can solve for any value.

Ex.2 Solve  $y = 2x^2 + 5x - 12$  for(a)  $y = 0$ 

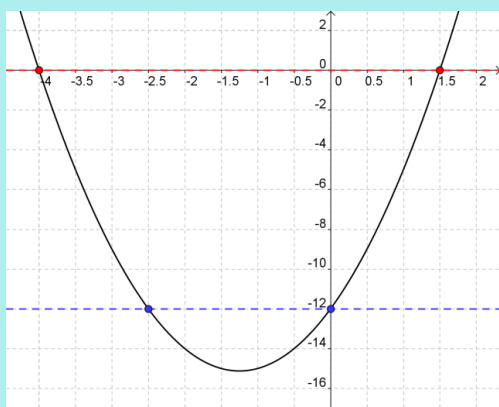
$$\begin{aligned} 0 &= 2x^2 + 5x - 12 \\ &= 2x^2 + 8x - 3x - 12 \\ &= 2x(x+4) - 3(x+4) \\ &= (2x-3)(x+4) \\ &\begin{array}{l} 2x-3=0 \text{ or } x+4=0 \\ \frac{2x}{2} = \frac{3}{2} \quad \boxed{x=-4} \\ \boxed{x=\frac{3}{2}} \end{array} \end{aligned}$$

(b)  $y = -12$ 

$$\begin{aligned} -12 &= 2x^2 + 5x - 12 \\ 0 &= 2x^2 + 5x \\ 0 &= x(2x+5) \\ &\begin{array}{l} x=0 \text{ or } 2x+5=0 \\ \boxed{x=0} \quad \frac{2x}{2} = \frac{-5}{2} \\ \boxed{x=-\frac{5}{2}} \end{array} \end{aligned}$$

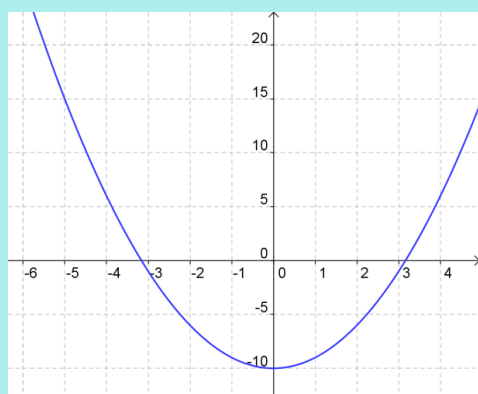
To solve using factored form:

- 1) Expand all terms
- 2) Move all terms to one side of the equal sign so that the equation equals zero
- 3) Factor your expression (if possible)
- 4) Set each factor equal to zero and solve

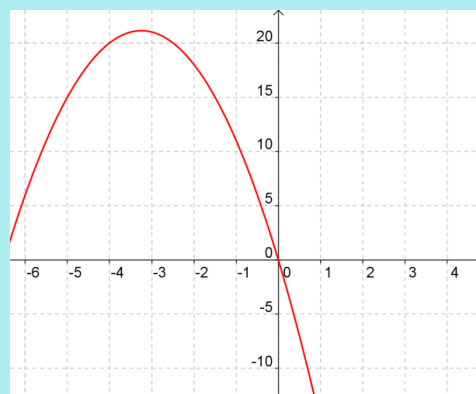
Ex.2 Solve  $y = 2x^2 + 5x - 12$  for (a)  $y = 0$   
(b)  $y = -12$ Ex.3 Solve:  $x^2 - 10 = -x(2x + 13)$ 

$$\begin{aligned} x^2 - 10 &= -2x^2 - 13x \\ x^2 + 2x^2 + 13x - 10 &= 0 \\ 3x^2 + 13x - 10 &= 0 \quad \text{M} \quad \text{A} \quad \text{N} \\ 3x^2 + 15x - 2x - 10 &= 0 \quad -30 \quad +15 \quad 15 \div -2 \\ 3x(x+5) - 2(x+5) &= 0 \\ (3x-2)(x+5) &= 0 \\ &\begin{array}{l} 3x-2=0 \text{ or } x+5=0 \\ \frac{3x}{3} = \frac{2}{3} \quad \boxed{x=-5} \\ \boxed{x=\frac{2}{3}} \end{array} \end{aligned}$$

$$y = x^2 - 10 \quad \text{LS.}$$



$$y = -x(2x + 13) \quad \text{RS.}$$

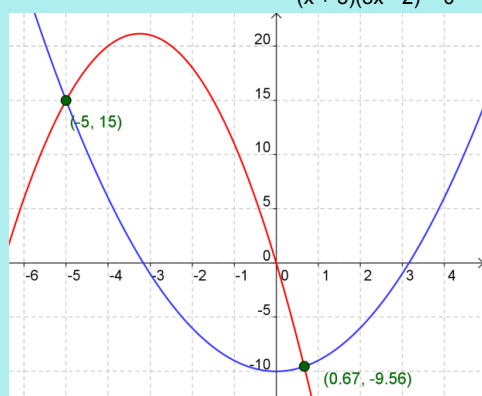


$$x^2 - 10 = -x(2x + 13)$$

which became .....

$$3x^2 + 13x - 10 = 0$$

$$(x + 5)(3x - 2) = 0$$



Assigned Work:

p.320 # 4ac, 6ace, 7ace, 11